

REMARKS

This application is amended in a manner to place it in condition for allowance at the time of the next Official Action.

Claims 10-13 and 19-30 were last examined.

The claims have been amended, including adding new claims.

Claim 10 has been amended to replace the expression "switching off the gene coding for starch phosphorylase" by the expression "essentially preventing the expression of starch phosphorylase or inactivating starch phosphorylase" and the expression "reduce the activity of starch phosphorylase" by the expression "essentially abolish the activity of such phosphorylase" .

It has been further specified that the step of introducing a mutation is performed by inserting nucleotide(s) in the gene coding for the endogenous starch phosphorylase.

Support for these amendments may be found page 5, lines 32-36 of the application as filed and in previous claim 20.

Claim 11 has been amended to replace the expression "switching off the gene coding for starch phosphorylase" by the expression "essentially preventing the expression of starch phosphorylase or inactivating starch phosphorylase" and to specify that the step of introducing a mutation is performed by inserting nucleotide(s) in the gene coding for the endogenous starch phosphorylase.

Support for these amendments may be found page 5, lines 32-36 of the application as filed and in previous claim 21.

Claims 20 and 21 have been cancelled without prejudice.

Claim 26 has been amended to replace the expression "switching off the gene coding for starch phosphorylase" by the expression "essentially preventing the expression of starch phosphorylase or inactivating starch phosphorylase" and to specify that the introduced mutation includes the insertion of nucleotides in the gene coding for starch phosphorylase.

Support for these amendments may be found page 5, lines 32-36 of the application as filed and in previous claim 27.

Claim 27 has also been cancelled without prejudice.

New claims 31 to 34, which correspond to the embodiments for which enablement has been acknowledged by the Examiner, have been introduced.

No new matter is entered by these amendments.

Claim Rejections - 35 USC § 112-scope of enablement

The Official Action stated that claims 10-13 remain rejected and claims 19-30 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for random insertional mutagenesis and the screening of a phenotype wherein the enzymatic action of starch phosphorylase appears to be reduced or abolished, does not reasonably provide enablement for the insertion of any number of nucleotides at any point along any length of any gene other than the starch phosphorylase gene

wherein starch phosphorylase is switched off in which starch grain size and/or starch content of any plant part is increased as broadly claimed.

Further, the Official Action stated that the specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention commensurate in scope with these claims.

Response

The Examiner acknowledges that the content of the application enables implementing random insertional mutagenesis and screening a phenotype wherein the starch phosphorylase activity is reduced or abolished. In particular, she considers that the content of the application enables inserting T -DNA in the gene coding for starch phosphorylase.

Nevertheless, she considers that it would not enable carrying out an insertion of any number of nucleotides anywhere in any gene other than the gene coding for starch phosphorylase so that starch phosphorylase is switched off and the size of starch grains and/or the starch content of any plant part is increased.

Specifically, she alleges that, since previous claims did not specify that the mutation is introduced in the gene encoding starch phosphorylase, they would not exclude that the mutations may be introduced in a gene encoding another protein.

Without prejudice, claims 10 and 11 have been amended to specify that the mutation is performed by inserting nucleotide(s) in the gene coding for the endogenous starch phosphorylase, thus rendering this objection moot.

The Examiner further considers that, as the length of the insertion is not specified in the claims, the person skilled in the art would not be able to determine the mutations that would enable switching off the gene coding for starch phosphorylase.

Applicant respectfully disagrees.

Indeed, the skilled person knows many techniques that enable abolishing the expression of a gene by inserting nucleotide(s) in this gene, such as knock-out techniques, insertion of reporter or selection genes, and insertion of T-DNA.

In addition, applicant points out that inserting at least one nucleotide in the gene coding for starch phosphorylase modifies the open reading frame of this gene and therefore necessary leads to a dramatic modification of the expression of this enzyme and of its function.

Accordingly, the insertion of nucleotide(s) in the gene coding for starch phosphorylase enables abolishing the activity of such phosphorylase.

Therefore, the amended set of claims complies with the requirements of 35 USC § 112.

Withdrawal of this rejection is solicited.

Claim Rejections - 35 USC § 103

The Official Action stated that claims 10-13 remain rejected and claims 19-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Critchley et al (2001 The Plant Journal 26:89-100) and in view of Kossman et al (US patent 6686514).

Response

Critchley et al. is offered to show that the use of T-DNA to inactivate genes was well-known from the skilled person and would have already enabled increasing the starch content of plants. Moreover, according to the rejection, this document would demonstrate that the gene of starch phosphorylase was known to play a role in the starch content and in the size of starch grains.

Since Kossman et al. would show that the gene coding for starch phosphorylase had already been switched off, the rejection urges that one skilled in the art would have been motivated in view of these results to switch off the gene coding for starch phosphorylation by T-DNA insertion.

Claims 10 and 11 have been amended to specify that the mutation introduced in the gene coding for starch phosphorylase leads essentially to a non-expression or an inactivation of starch phosphorylase.

Furthermore, as indicated in response to the previous office action, the subject-matter of the present application relates to methods enabling increasing both the starch content

and the side of starch grains in plants, by essentially preventing the expression of starch phosphorylase or inactivating starch phosphorylase.

Kossman et al. describe transgenic maizes wherein starch phosphorylase activity is only reduced, for example by introduction of an antisense nucleic acid. This reduction would lead to a modification of starch synthesis.

Kosman et al. thus does not describe or suggest a non-expression or an essentially complete inactivation of starch phosphorylase.

Accordingly, although Critchley et al. discloses the inactivation of D enzyme by T-DNA insertion, the skilled person would not have been incited to use this technique in the process described in Kossman et al. since this process only aims at reducing an activity and not at inactivating said activity.

Moreover, Kossman et al. does not suggest that inactivating starch phosphorylase could induce both an increase of the size of the starch grains and an increase of the starch content, all the more as, as indicated page 3, lines 3-7 of the present application as filed, the increase in the size of starch grains is not necessarily associated with an increase in the starch content.

Furthermore, in view of Critchley et al., one skilled in the art would not have been incited to inactivate starch phosphorylase because the phenotype of increased starch content

is associated in this document with an increase in starch phosphorylase activity (page 92, right column, first paragraph).

Similarly, in view of Smith et al., one skilled in the art would have expected that a loss of starch phosphorylase expression would have no general impact on carbohydrate metabolism in leaves (page 580, right column, first paragraph).

Accordingly, in view of the prior art, the skilled person:

(i) would not have combined Kossman et al. and Critchley et al.; and

(ii) would not have obtained the invention defined in the attached amended set of claims.

Accordingly, the claims are non-obvious.

Reconsideration and allowance of the claims are respectfully requested.

Should there be any matters that need to be resolved in the present application; the Examiner is respectfully requested to contact the undersigned at the telephone number listed below.

The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to our credit card which is being paid online

simultaneously herewith for any additional fees required under 37
C.F.R. § 1.16 or under 37 C.F.R. § 1.17.

Respectfully submitted,

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